

SUGGESTION: (Continued)

and cost benefits. Data collection will be an integral part of the program so that benefits to the Agency can be specified and also so that the program can be altered to meet the changing needs of Agency personnel.

ADVANTAGES: (Continued)

(3) decreases lost work time due to both physiological and psychological illness; and (4) improves the morale of employees.

THE WISE, FOR CURE, ON EXERCISE DEPEND

Dryden, Epistle to John Dryden; 1.94.

The Agency may have an exercise area, but it does not have a fitness program. I intend to present not only the psychological and physiological benefits associated with such a program, but also, the cost benefits or cost effectiveness of a good fitness program. There is evidence that good fitness programs pay for themselves and possibly even result in a sizable net gain.

#### A FITNESS PROGRAM

What is exercise or fitness? Exercise does not have to be hated drills, boring routines, or painful experiences. Many of us have suffered through a program which has alienated us to exercise and fitness. Exercise experts and psychologists have shown that unless the attainment and maintenance of fitness can be made to be a pleasurable experience, people will quickly drop out of the program. For the novice there may be some aches, pains, or stiffness, but these negatives can be minimized. Ideally, the program should be designed so that exercise becomes a habit and fitness a life pattern. Adequate rewards must be provided for the novice until the rewards generated by the exercise itself become sufficient to maintain the habit of exercise. Initially, then, rewards must come from an instructor and through the attainment of minor goals on the path to fitness.

An instructor must try to individualize the program based on the psychological needs, the physiological needs, and the goals of the individual. The instructor must insure that there is a very gradual buildup towards fitness so that the body is not overstressed. Yet, at the same time, he must insure that the program becomes progressively more difficult as the person's physiological system adapts to the challenges of the fitness program.

One of the hardest tasks of the instructor is restraining both the beginner and the fit individual. The beginner does not realize the importance of gradualness, and the fit individual forgets his limits or does not have enough information to know when exercise will be harmful.

Motivation is very important in an exercise program. Some people are loners. They do not want to be in a group and

are best in a solitary jogging and stretching program. For others the group atmosphere gives them the encouragement they need to continue in the program. It is important that the instructor determine what motivates the individual so that the program can be designed to take advantage of the individual's intrinsic motivation.

Any fitness program must be based on diversity. No single exercise provides the challenge, motivation, or training that the body needs. Experts have pointed out that the best programs include both cardiovascular conditioning and flexibility training. Cardiovascular conditioning includes such exercises as jogging, skipping rope, stair climbing, and even dancercise. The variety of stretching exercises are too numerous to catalogue.

Accurate records of individual performance are essential. Charts provide the feedback that can serve both as motivation and positive reinforcement to the individuals in the program. Before the individual feels the benefits of exercise, the charts indicate that progress is being made. Charts also provide feedback to the instructor and can indicate when changes need to be made in the individual's exercise program.

A program could be detrimental to the health of individuals. Painful experiences, soreness, stiffness, tired feelings, and even injuries could be the norm rather than rare occurrences. Instead of being mentally relieved, the exercise program could be another stressful situation with detrimental effects on the health of the individual. Therefore, the program needs to be designed and implemented by professionals who know how to maximize the benefits of an exercise program while minimizing the negative aspects that could accompany such a program.

It would appear that a program needs the skills of a physical therapist, a medical doctor, and a psychologist. Mr. Tucker provides the current expertise in physical therapy and occasionally advises people on appropriate exercises and the use of equipment. The Office of Medical Services has provided the medical expertise. But psychology has been ignored, and there has been no one to develop a true fitness program. I propose myself as a psychologist who would complement the existing professionals and both design and implement a fitness program.

There are numerous changes that I would propose. First, there would be voluntary classes throughout the day. These

classes would offer as many fitness options as possible. An attempt would be made to insure that each class improve the cardiovascular system and the flexibility of the individual. Each individual would be encouraged to maintain a chart to record progress. These classes would be voluntary, but individuals identified as needing exercise programs by medical services would be strongly encouraged to participate.

In order to assess the fitness program and improve it, an adequate research design and data collection need to be undertaken. Data collection would include such things as the incidence of illness, length of illnesses, productivity, and morale of both those participating in the program and adequate control groups. Although research is time consuming and adds to the cost of the program, it allows verification of the financial benefits associated with the program and helps to keep the program focused on the original goals. My past experience with research would allow me to choose an adequate experimental design, select proper control groups, perform the statistical analysis, and present the results in a proper format.

Someone in the program should monitor current research and the experiences of other programs so that new information could be incorporated into the fitness program. I feel that I could handle this part of the program quite adequately. I am familiar with most of the journals and other publications which provide coverage of new research in the fitness area. My background in physiological psychology enables me to digest the technical medical articles.

A suggestion-complaint box would give the users of the facility a vehicle to express their needs and problems concerning the fitness area and program. A bulletin board would allow the posting of: (1) the steps taken to implement a suggestion or alleviate a problem, (2) the progress made in implementing the changes, (3) requests for help in solving various difficulties encountered, and (4) reasons why there has been no action on certain complaints or suggestions.

I would make it my personal responsibility to see that the fitness room was kept clean. Periodic maintenance on the showers, such as pouring a commercial drain product down the drains, may prevent the frequent drain stoppages and eliminate or lessen this health hazard.

Women in general have a different approach to exercise than men. I have heard several women comment that the present equipment is male oriented. There are several relatively inexpensive pieces of equipment that have been designed for the typical exercise goals of women. Women also have to be educated as to how to adapt the present equipment to their own needs and goals.

I would propose that on even days of the month people run clockwise on the track, and counterclockwise on odd days. The stress and strain from the sharp corners on the track probably lead to strains, sprains, and muscle soreness. Although the sharp corners cannot be eliminated without a major renovation and the acquisition of new space, balancing the stress on the legs would tend to eliminate some of the problems associated with this track.

Along with this I would explore the possibility of a better track either inside or outside. A good track is an essential crutch for many runners. It allows runners to accurately measure how far they have run, how fast they have run, and can offer an excellent running surface, thus minimizing injuries.

I would recommend that hand dryers be installed at about the 5 feet level in each locker area so that persons in both locker rooms could not only dry their hands, but also their hair.

The above suggestions are only a sample of what needs to be done. Although many of these suggestions could be called plain common sense, it would take someone who is motivated, believes in the fitness program, can establish rapport with a wide variety of people, and is able to persevere against the bureaucratic obstacles that always appear, to implement such a program.

#### COST EFFECTIVENESS

A physical fitness program can be a profitable investment in the health, vigor, morale, and longevity of the men and women who are the Agency's most valuable asset. (S)

In 1976 it is estimated that heart disease cost businesses \$50 billion in direct and indirect costs such as lost production. (C) Over 132 million workdays are lost annually in the US due to heart

attacks. (C) Xerox corporation estimates that it costs \$600,000 for each executive who must be replaced. (C)

Although there is still medical disagreement as to what extent heart attacks can be prevented, most researchers agree that there is an inverse relationship between the risk factors associated with heart disease and physical fitness. Physical fitness in a well-designed program produces the following effects which help to explain why those who are fit are less likely to have heart disease: (Q)

--There are increases in the efficiency of the lungs enabling them to process more air with less effort. During exhausting work, a conditioned man may process twice as much air per minute as a deconditioned man.

--The heart grows stronger and pumps more blood with each stroke, reducing the number of strokes necessary.

A conditioned man may have a resting heart rate 20 beats per minute slower than a deconditioned man, saving as many as 10,000 beats in one night's sleep. During exertion, the conditioned heart can pump at much lower rates and still adequately meet the body's needs.

--Conditioning increases the number and size of the blood vessels that carry blood to the body tissue,

--Conditioning increases the total blood volume,

--Conditioning improves the tone of the muscles and blood vessels, often reducing blood pressure,

--Conditioning changes fat weight to lean weight -- that is fat to muscle.

Several researchers including K. Cooper; D.P. Smith, and F.W. Stransky; B. Ekblom; W. Horne; S.W. Frank; S.M. Fox; J.P. Naughton et al; J.A. Bonanno and J.E. Lies; P.M. Yarvold et al; and W. Siegel and G. Blomquist et al have indicated that their research shows that physical fitness can significantly reduce the risk of heart attack. (Sited in C) The landmark study in this area was done by R.S. Paffenbarger. In his study on 17,000 Harvard alumni, he found that those who participated in strenuous physical activities for at least 3 hours a week had significantly fewer heart attacks. (D) The nonexercisers

had a 64% higher risk of a heart attack than their more energetic classmates. Dr. Paffenbarger found that this effect was largely independent on such other coronary risk factors as high blood pressure, cigarette smoking, overweight, and family history of heart disease. Dr. Paffenbarger did not support the contention that those who exercise strenuously are more fit to begin with. The reduced risk of heart attack was evident even in those who had started their exercise program some time after their college career. In general, he concluded that one needs 3 hours of strenuous cardiovascular conditioning exercises to obtain maximum protection against heart disease. (D)

Thus, it is safe to conclude based on the available scientific evidence that a properly designed fitness program will lead to decreases in heart disease. Because of the direct and indirect costs associated with heart disease, the savings will more than pay for all but the most extravagant physical fitness programs.

Backaches are responsible for more lost work time than the common cold. (B) Research has shown that contributing factors in many problems concerning the back are inadequate exercise and lack of tone of the musculature. Exercise can alleviate or prevent many backaches. (R,T)

SEveral researchers have found a significant relationship between the attainment of fitness and a reduction in both the occurrence and length of illnesses. K. Smirnov et al (P) found that those engaged in exercise consulted doctors four times less than those not exercising and loss of work because of sick time was 10% less than that of nonexercisers. Research by A. Dembo, N. Greevskaya, V. Zholdak, G. Vasilyeva et al; V. Malova, L. Sorokiva, I. Okk, M. Baka, Z. Loktronova, and others have confirmed that the more physically fit have less illnesses and absent from work fewer days per illness than those who are less fit. (Cited in P) In their extensive research program, the Russians have found that this holds true for industrial, office, and professional workers. (P)

Two of the most serious occupational hazards are the desk and the swivel chair. Man's work environment has evolved, but the human body has not adapted to inactivity. The body still requires regular and vigorous use.

As we grow older, the ability of the heart to function as a pump declines approximately 1 percent per year, probably due to a weakening of the heart muscle. Along with this loss, the arterial blood pressure ordinarily increases, the coronary

arteries become plugged up and circulation in general slows down. Along with the changes in the cardiovascular system, the respiratory system loses some of its vital capacity. The chest wall seems to become stiffer and breathing requires more muscular effort.

Our skeletal muscles decrease gradually in strength and endurance. Indeed, we probably lose 3 to 5 percent of our active protoplasm -- largely muscle-- each decade after maturity. In spite of this loss of active tissue, people usually gain weight as they grow older. It is worthy to note that even if the weight of early maturity is maintained, one would still be getting fatter, since the replacement of the active tissue lost is very largely adipose tissue.

By age 75, men have on the average lost about 50 percent of their maximal oxygen consumption and the data for women follow roughly a parallel course.

Interestingly, many of these negative changes, particularly the loss of aerobic capacity or vigor can be brought about in young well-conditioned men by the simple expedient of enforced bed rest. A well designed study found that after three weeks of bed rest, the maximal cardiac output decreased 26 percent, the maximal exercise stroke volume of the heart decreased 30 percent, oxygen consumption decreased by 30 percent, and the amount of active tissue declined by 1.5 percent. (T)

This study and others like it indicate that the observed age-wise losses are not necessarily age changes but may be brought about by the long term deconditioning of the increasingly sedentary life one lives as he grows older. Although an aging process does exist, the negative effects of this process can be drastically altered through proper conditioning.

In summary, inactivity is thought to contribute to hypertension, premature aging, chronic fatigue, physical inefficiency, poor musculature, and a lack of flexibility. This lack of conditioning or inactivity can be thought of as a contributing factor for lower back pain, back injuries, mental tension, coronary heart disease, and obesity. As preventive medicine exercise has few equals. It is practical, inexpensive, and proven effective for numerous health problems.

#### THE MENTAL AND PSYCHOLOGICAL EFFECTS

Physical fitness appears to positively affect the mental abilities, the psychological health, and the morale of employees.

Physical fitness was found to correlate with both creativity and work capacity in a group of scientists who belonged to the prestigious USSR Academy of Sciences (Podelko E). Studies by Volkov, Nagorny, Iamarenov, and Kapovsky (Cited in P) showed that regular physical activity resulted in improved academic performance by students. K. Cooper of the US also has found a positive relationship between fitness and students' grades. Martinuk of Canada found improved memory with increased fitness. Thus there appears to be a positive relationship between mental work and physical fitness.

Jogging is not a mental cure-all, but it does help work off tension and can create a feeling of well being that transfers to other areas of the joggers life. Ismail and Tractman found that when middle aged men embarked on a regular exercise program, there were several positive results. The men became more self-sufficient, resolute, stable, and imaginative. (See I) Participants in exercise programs are better able to withstand emotional stress. Jette (See I) found that habitual exercisers are less anxious than nonexercisers. Several psychiatrists and psychologists have successfully used exercises, especially jogging, to treat various mental illnesses. (RW Jan 78) Fitness, then, seems to play both a preventive and ameliorative role in mental health. There is some evidence that jogging acts as a natural tranquilizer. (I) Jogging has been found to be very beneficial to those who suffer from insomnia. Jogging tends to eliminate the emotional stress which more than any factor prohibits sleep. Most executives are under a great deal of stress and tension. Decisions constantly have to be made and workdays are frequently 10 to 14 hours long. The mental exhaustion accompanying these pressures can easily disrupt sleep. Although scientific proof of the effect of jogging on sleep has not been established empirically, it is a generally accepted phenomena. (Q,U) The author of this paper can personally attest to the positive relationship between jogging and sounder and more consistent sleep.

Morale can be an amorphous entity. However, there are several measures which indicate the relationship between morale and physical fitness. First there are the subjective reports as in the NASA study in which 40 percent of the participants specifically mentioned a more positive attitude toward work. (C) These subjective measures also are supported by corollaries of high morale that is high productivity and low absenteeism. Exercisers according to E. Podalko have a higher working capacity;

the rate of their output ranging from two to fifteen percent higher than nonexercisers. This tendency to be more productive in both mental or manual work is supported by the studies of K. Volkov, V. Nagorny, B. Zamerenov, and T. Karpovsky. (See P) The positive relationship between fitness and low absenteeism has already been commented on.

In summary, a healthier employee is a more effective employee. He contributes more when he is on the job, and because he is healthier and has better morale, he spends less time off the job. (Morrison)

There is no need to reinvent the wheel. There are many established programs from which information can be obtained. Therefore, there is greater chance of success because the exercise program can be modeled after successful programs.

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EVALUATION REPORT

TO: Executive Secretary Suggestion and Achievement Awards Committee	SUGGESTION NO.	SUSPENSE DATE
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INSTRUCTIONS: Please complete this form in detail to guide the Suggestion and Achievement Awards Committee in making a final determination of the merits of this proposal. Retain third copy.

1. ACTION RECOMMENDED

 ADOPT DECLINE

OTHER (Specify):  
(See Para. 2)

DATE ADOPTED

2. REASONS FOR RECOMMENDATION (If more space is needed, use plain paper)

OMS has had under serious consideration for a number of months a physical fitness program. It has been adopted as an office objective and OMS is studying different approaches to implement its program. It must be admitted that the study is in a very early stage at the present. There has been considerable Agency interest in a fitness program and a program potentially involving many employees will take considerable time and resources.

If the author of this suggestion believes he or she can offer helpful suggestions, they would be welcome.

3. TANGIBLE FIRST-YEAR SAVINGS (Man-hours, material, equipment, etc.)

Undetermined

4. INTANGIBLE BENEFITS (See guide on reverse side of third copy)

Undetermined

5. WHAT OTHER OFFICES, DIVISIONS, ETC. MIGHT ALSO USE THIS IDEA?

None

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28 June 1978

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